

JOIN VECTOR'S END USER CLUB
GRAND PRIZE WINNER - A VECTOR SX COMPUTER
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by Dick Hahn, Senior Vice President, Marketing and Sales
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A recent survey conducted by Vector indicated that most end users want to upgrade their Vector Products. Many of the end users do not have a Vector dealer. They were not aware of upgrades in software and hardware and new products that are available from Vector today. In order to supply current information and an easy way of ordering Vector products, we are establishing a Vector End User Club. Since you are one of the more than 29,000 end users of Vector equipment, we are providing you with an opportunity to join with other end users in this new organization.

To join the Vector End User Club, please respond with your name and address on the enclosed card. All cards will be used for a drawing to be conducted on March 15, 1985. The winner of the drawing will receive a new Vector VSX computer.

As a member of the Club, you will receive updated Vector product information on:

Vector Computer Upgrades	New Products
Vector Software Upgrades	Dealer Location Information

New Software Versions Available

Software programs are dynamic and subject to change. Do you have the latest release of ExecuPlan II or MEMORITE III? Each new release is created to fix reported problem areas or to add new features. We will be happy to send you a new release for a nominal fee. Call Vector Customer Support at 805/499-5831.

New Vector Graphic Systems

Our Engineering staff has been busy developing new products during the past year. The new VSX and VMX Series offers large memory up to 896,000 characters and formatted disk storage of 5, 10, 28, 36 or 112 million characters. For those who want a multiuser system, the new VMX Series is the answer. Each VMX supports up to four users simultaneously and will execute both 8 and 16-bit applications. Both types of systems may be configured in a LINC local area network to share information files and programs. These new systems support the powerful Digital Research Concurrent CP/M operating system. Microsoft's MS-DOS 2.0 is also available on the VSX Series. We will be happy to mail you more information on these products - just ask.

Were you aware that there are two new manuals to make MEMORITE easy to learn? They are: "MEMORITE III, A Tutorial Approach" and a new "MEMORITE Reference Guide". They will tell you how to get more productivity from your word processor investment.

Vector Systems Can be Upgraded

Most Vector computers can be upgraded to offer a larger disk storage capacity. For example, we offer economical upgrade kits to replace a floppy disk drive with a 5 million character drive. On some systems, a 5 million character drive may be replaced by a 10 million character drive. The valuable information files you have created under CP/M may be transferred from a Vector 3 Series computer to the new VSX or VMX system without reentering the information.

Ordering Additional Vector Products

If you would like to order additional Vector Products, but have no dealer to service your request, call our Customer Support Department at 805/499-5831. We will help you locate an authorized Vector Dealer. If there isn't a dealer in your area, you may buy directly from Vector. Pre-payment or C.O.D. is required.

Service on Vector products can be arranged through TRW or a Vector servicing Dealer. The VSX, VMX and LINC 3.0 are serviced exclusively by servicing dealers at the present time.

Need to Locate a New Vector Dealer?

We will help you locate the Authorized Vector Dealers in your area. Call our Customer Support Department at 805/499-5831.

Ed note: The registration form is included as pages 3 and 4 of this newsletter. Note the 3/11 deadline.
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THOUGHTS ON UPGRADING AN S-100 BUS

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by Burks A. Smith of Datasmith
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One thing all MUG members have in common is the S-100 bus. Introduced in the mid-70's in the Altair and IMSAI computers, the S-100 bus defined a "standard" of hardware communication based on a 100 contact printed circuit card socket which, according to legend, was available as cheap surplus to the original Altair designers. With the early proliferation of S-100 machines, the standard was taken seriously by the engineering establishment and eventually led to the IEEE-696 official standard for the bus.

According to the standard, there isn't much you can't do with an S-100 bus. It isn't tied to any particular processor, so you can build just about any type of computer you want just by plugging boards in sockets. Memory cards that work with an old Intel 8080 "should" work with an Intel 8086 or even a Motorola 68000. Twenty-four address lines have been set aside so you can access a whopping 16 Megabytes of memory, and there is even provision for Master and Slave processors so you can build sophisticated multi-processing systems. As far as peripherals are concerned, you can keep plugging in interface boards for rooms full of terminals, printers, plotters, and other goodies.

The bad news is that, by the time the bus became standardized, the industry was already moving away from S-100 computers and the installed base was woefully non-standard. My IMSAI needed major front panel surgery before it could tolerate a Z-80 and even Vector Graphic deviated from the standard with the Vector 4 by tinkering with the power supply so they wouldn't have to put voltage regulators on every card (too expensive). Right now, just about the only truly S-100 compatible computer you can buy is a CompuPro, which has steadfastly supported the bus without cutting corners.

The reason for the movement away from S-100 is apparently economic. Those 100 contact sockets are no longer cheap and advances in chip density have led to much lower component counts. Since you can put a whole computer on one S-100 card, what is the use of a 20 socket motherboard? Every contact is a potential source of noise, so soldering all the components into a single board yields a more reliable computer. Sure, the new IBM compatible computers have expansion slots for I/O cards and additional memory, but the processor, support chips, and minimum memory are all on a single PC board.

Even though your S-100 bus can theoretically support a state of the art system, your present cards may not be compatible with the newest hardware. Timing signals may be off by a few microseconds and your computer may use S-100 lines that were undefined at the time your computer was built, but are now reserved for a different purpose. Another problem is system software. If you want to upgrade to a hard disk, for example, your operating system must know how to access it. If you want to make your machine multi-user, your operating system must support more than one user. Unless you are an assembly language programmer with experience in systems software and interfacing, it is unlikely that you will be able to write the proper code yourself.

The bottom line is to make sure you know what you are getting into when you upgrade your S-100 machine. If you buy a piece of hardware, make sure you know that it is compatible with your machine and that you can obtain the software to use it. One way to do this is to buy upgrades that are specifically intended for your machine. If you use a Vector Graphic computer, buying a Vector Graphic hard disk (and Vector's version of CP/M that drives it) will assure you of the fewest possible hassles. If you buy a "bare bones" hard disk and controller, be prepared for an adventure in installation. The following are some suggestions when considering an upgrade.

MEMORY. If you don't have the maximum amount of memory your computer can support now, it is an easy task to add more and prices are quite reasonable. Eight-bit computers can directly address 64K of memory and adding more will enable you to write larger programs and store more data in memory, although there will be no benefit to your existing software that doesn't need more memory. Some software, such as word processors and spreadsheets, will directly benefit, allowing you to edit larger blocks of text or build spreadsheets with more rows and columns. Not all computers can use the full 64K of memory. If you have a monitor program in Read-Only Memory, the ROM's address may effectively block expansion past a certain point. Most Vector Graphic machines, for instance, have a monitor ROM addressed at E000 hex, limiting user memory to 56K. These machines use the full 64K of memory, but RAM addressed above the monitor is reserved for video storage and scratchpad storage for the monitor and I/O routines. Most other machines have ROMs too, and you should be aware of any restrictions in memory expansion that may result.

With an 8-bit processor, even though your S-100 bus can support 16 MB of memory, adding more than 64K will be of no value with a single-user, single-task operating system because the operating system is not designed to use the additional memory. Memory in excess of 64K is only of value in multi-user systems designed to access it. If you need a multi-user system, it may be more cost-effective to buy a computer that supports it out of the box.

(continued on page 5)

THOUGHTS ON UPGRADING AN S-100 BUS (continued from page 2)

DISK DRIVES. Your Micropolis controller will support four Micropolis drives. If you have fewer than four drives and need more, it is an easy task to add more. All you need is a cable with extra socket(s) for the new drives and to perform a few hardware jumper changes to tell the controller the new drives are "on line". You can also increase capacity by changing to double-sided drives, which Buzz has explained in previous issues.

You can also add 8" standard (CP/M) drives to your existing system using the a Tarbell dual-density controller. Hawkeye Grafix has a CP/M BIOS containing both Micropolis and Tarbell disk drivers, so that you can use both types of drives at the same time and transfer files with the PIP command. Hawkeye's source code needs to be modified for your specific terminal and printer, and isn't compatible with Vector Graphic's assembler, but I have performed the modifications for Vector System B's and can sell the system through an arrangement with Hawkeye. Almost all CP/M software is available on 8" disks, so this will greatly expand the software available for your machine, providing you run CP/M.

Hard disks are a different problem. As mentioned above, you can install Vector hard disks on Vector equipment with little trouble. You could also buy a Micropolis hard disk and their OSM operating system if you are running MDOS. The Micropolis hard disk has a higher capacity than most people need for personal computing and is rather expensive, so this option may be too expensive for most users. The OSM operating system is very impressive and is a good choice if you need multi-user, multi-tasking. If you buy another brand of hard disk, the manufacturer probably provides a CP/M BIOS that will run it, but you may have to do some assembly language programming to get it to work with your other peripherals. With a brand-X hard disk, you will probably have to abandon your Micropolis drives, since the new BIOS won't know what to do with them. The only solution to this is to get a copy of a Micropolis disk driver routine and patch it in yourself, which is "non-trivial" in computerese.

A NEW 16-BIT PROCESSOR. Forget it. Dual-processor boards are available, but obtaining and modifying the operating system software to work with your present setup is out of the question unless you are an expert in such installations and are willing to spend long hours tinkering. If you need the power of a 16-bit computer, go out and buy one.

IF IT AIN'T BROKE, DON'T FIX IT! Most microcomputer users bought their machines to solve specific problems. Does your computer solve yours? If so, you can save yourself a bundle of money and a lot of headaches by doing nothing. You can keep your old machine until the cost and trouble of maintaining it exceeds the value of its services. Be aware, however, that someday it WILL break and the cost of repairing it may not be justified. You should prepare yourself for this eventuality by making sure you have sufficient backup and starting to investigate what is available in new equipment. One thing is almost certain: Your next computer will not be compatible with your present one.

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HOW EASY CAN IT GET?

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by Buzz Rudow

There was an article about small business computers in one of the major magazines, PEOPLE, I think, that said something like - If you didn't want to learn about computers but wanted to use one, wait five years. At that time computers would be as simple to use as TVs.

When I first read that I thought - Humm - That's pretty good. But then the statement kept popping into my mind about twice a day. I kept questioning it. Is it advertising hype? Couldn't be. Who'd want to convince people to wait five years before buying. Someone must really believe it. Well, I don't.

Television is a passive device that only requires you to know how to rotate a channel selector. There's no user input. How does the selection of a TV program compare to having a business problem, knowing it can be solved by the computer, knowing which program of 100,000 on the market you should use, knowing where it is on the computer or in your disk archives, knowing how to run it, how to set up the data fields, how to input data, and how to output the results?

Oh, I know computers are getting easier to run. I certainly can believe that systems can be set up to do a task for an uninformed user. I'm not sure any of us would want such a machine, however. Such simplicity seems to limit alternatives. I'm running a DEC PRO-350 at the office that is totally menu driven. Pretty simple - and pretty slow. Always have to go through the menus, even if you know what you want to do. From what I've used, and from what I've read, simplicity is directly proportional to increased memory requirements and inversely proportional to execution speed. If the computer is going to make all the user's decisions for him, the code takes memory space and execution of the code takes more time.

The problem is, the world's getting more complex. People better just accept that. Personally I think we'd better follow along and try to understand. Otherwise the guy who's going to make it simple for me is going to make a better arrangement for himself. It doesn't matter whether we're talking about computers, economics, politics, sex or religion.

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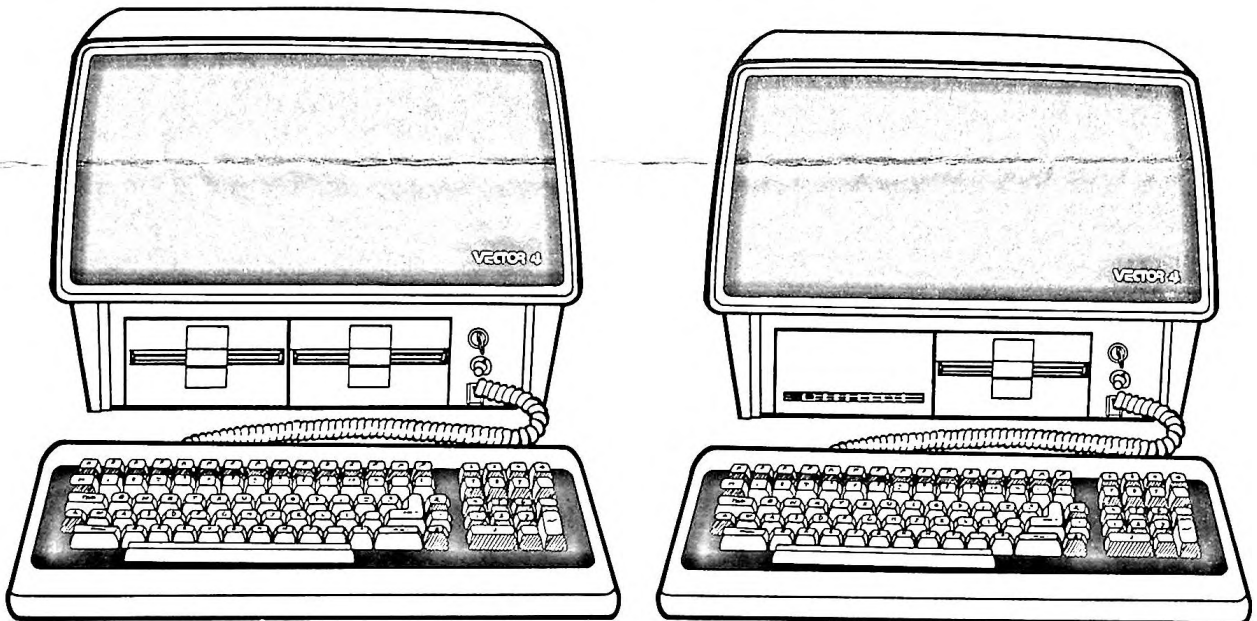
CURRENT VECTOR GRAPHIC COMPUTER MODELS

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by Lou Woody, Sunrise Data Systems
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Although most of you Vector Graphic owners out there have older Vector systems, I thought it would be interesting to you to learn about the systems that are currently in production. Things have changed immensely since the "System B" days. Gone are linear power supplies, the "boat anchor" mainframes, and gray display screens. These have been replaced with switching (regulated) power supplies, single-board construction, and green screens, all of which may or may not be improvements, depending on your perspective.

There are four basic "families" of computers being manufactured at the present. These include the "Vector 4", "Vector 4S", "VSX", and "VMX". These are all essentially identical in exterior appearance with exception of the label on the front and look like the illustrations below:



We will now discuss some of the characteristics common to all four families. First notice the disk drives. In all models, the disk drives are mounted horizontally in the terminal housing. The computer on the left has two floppy disk drives, while the one on the right has a floppy drive on the right and a hard disk drive on the left. From looking at the front, you can't tell which size hard disk the system has; they all look alike from 5 to 112 megabytes in capacity.

Now take a look at the detached keyboard. In addition to the obvious advantage of being movable in relation to the screen, it has fifteen function keys plus a few others. Depending on the operating system used, these function keys may be user definable. All systems come complete with 2 serial ports, 1 "Centronics" port, a 50 pin "Qume" port and an outlet for attaching an "RGB" monitor. All connectors are readily accessible on the back of the terminal housing.

Internally, all systems have two processors - an 8 bit Z80B and a 16 bit 8088 or 8086 which allow them to run "8-bit" or "16-bit" software. All systems support software written for CP/M, CP/M-86, and MS-DOS (MS-DOS is optional and not supplied with the base unit). All systems use what is referred to as an

"SBC" or single board computer which holds all computing electronics except the disk controller. The disk controller is inserted into one of the three available "V100" expansion slots. These "V100" slots are generally the same as "S100" slots except that the power is supplied already regulated.

Now let's get down to the nitty-gritty of the different families!

First the infamous "Vector 4" which was launched in September of 1982. The Vector 4 has a Z80B microprocessor and an 8088 microprocessor operating at 5.1 megahertz. The standard amount of internal memory is 128 kilobytes and is expandable to 256 kilobytes. It is the last (sigh) family to use the hard sector disk technology. This means that you can easily transfer data from any of the previous Vector machines via floppy disk to the Vector 4 and back. Unfortunately, this machine is a giant leap backward in performance compared to the older "Vector 3" series.

Next we have the "Vector 4S" series which came into production in November of 1983. This system is identical to the Vector 4 except for changing to soft-sector disk technology. This involves using a disk controller designed by Western Digital and soft-sector Tandon drives. From this point on, one cannot transfer information via floppy disk to and from the older Vector systems. There are several advantages, however, to the "new" disk technology. The first advantage is dramatically increased performance in programs with intensive disk operations. Secondly, it allows reading and writing of data onto other disk formats - specifically IBM-PC. Third, the machine can squeeze more data onto a diskette. The capacity is now 737 kilobytes for the soft sector diskettes versus approximately 600 kilobytes for the hard sector diskettes. One final advantage is increased reliability. The Vector 4 and 4S SBC has some "quirky" timing characteristics, as does the Vector hard sector controller. Sometimes a specific SBC mated with a specific disk controller will produce disk I/O errors without either component being definitely defective. The Western Digital controller eliminates these problems.

In March of 1984, the "VSX" arrived on the scene. Boy is it a screamer! Performance is unbelievable compared to any previous Vector machine or anything else currently on the market in its price range. The SBC in this machine has a Z80B operating at 6 megahertz and an 8086 at 8 megahertz. Standard memory is 128 kilobytes and is upgradable to 896 kilobytes in 128k increments. In addition to the previously mentioned operating systems, the VSX can be optionally equipped with Concurrent CP/M-86. This operating system will support 4 separate tasks (or programs) operating at the same time. Disk drive technology is the same as the 4S except that the operating system does more disk buffering, which speeds up disk operations.

The VSX was followed by the VMX in June. This system is essentially a VSX except that it is a multiuser machine with up to 3 "dumb" terminals (total of 4 workstations). This system runs an operating system called "Multiuser Concurrent CP/M-86". This allows for a total of 4 concurrent tasks on the main console with 1 task on each of the dumb terminals. Pretty sophisticated, huh? These 3 additional terminals, which are manufactured by Wyse, are significantly smaller and have a different keyboard design than the main console, as one would expect.

Below is a table which summarizes the various disk drive combinations for the four different families and gives the model numbers:

	Vector 4	Vector 4S	VSX	VMX
Two Floppy	V4/20	V4-S/20	VSX-2000	n/a
One Floppy & 5 meg HD	V4/30	V4-S/30	VSX-2500	VMX-2500
One Floppy & 10 meg HD	V4/40	V4-S/40	VSX-3000	VMX-3000
One Floppy & 28 meg HD	n/a	V4-S/50	VSX-4500	VMX-4500
One Floppy & 36 meg HD	V4/60	V4-S/60	VSX-5000	VMX-5000
One Floppy & 112 meg HD	n/a	n/a	VSX-8000	VMX-8000

Well, this should have given you some general knowledge of the computers that Vector Graphic is currently building. The third article in this series will cover the "LINC" network that is available for communications between these machines. Until then, keep on punchin' those keys!

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VECTOR GRAPHIC REACHES AGREEMENT IN PRINCIPLE WITH INVESTOR

Reprinted from the 1/11/85 Computer Retail News

Vector Graphic Inc., a microcomputer manufacturer that lost more than \$10-million in its last two fiscal years, said it has reached an agreement in principle with an international investor for repayment of \$1.7 million of secured indebtedness.

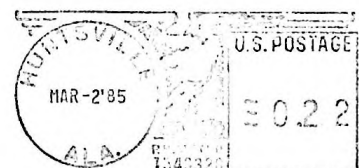
The agreement was reached with Eric Tang, who, as representative for a group of related companies, will guarantee the repayment and assume a major stock and voting position in the company. The microcomputer manufacturer said the financial move is needed to "revitalize" the company and help it expand its product line and market. Tang's group owns a number of Hong Kong and U.S. based companies involved in consumer electronics, textiles, real estate, and other businesses. Some of the companies also have investments in the People's Republic of China.

The investor's group will guarantee \$1.7 million of the total \$2.09 million of secured debt. Although Vector is currently in default of this indebtedness, shareholders have agreed to permit the Tang group to proceed.

In order for the investor to proceed, certain conditions must be met. Among those are a negotiated settlement with the company's unsecured creditors involving the issuance of Vector shares on a basis satisfactory to Tang's group. Also, certain major holders of Vector securities must grant to the Tang group options to purchase about 3.4 million issued and outstanding shares of Vector common stock. Those options would permit Tang to acquire approximately 1.7 million shares held by holders of secured notes at an exercise price of 1 cent per share upon payment in full of the secured note and all accrued interest.

The investor's group will be issued 2.5 million shares of Vector common stock and will hold a warrant to acquire 300,000 shares at 1 cent per share upon completion of the agreement. Tang's group will also acquire the legal power to vote an additional 3.4 million issued and outstanding shares of Vector common stock, currently held by the major security holders. The company has 7,827,438 shares outstanding. The Tang group transaction is tentatively scheduled to close on or before May 5.

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